

- 1 -

SEQUENCE LISTING

(1) GENERAL INFORMATION:

- 5 (i) APPLICANT:
(A) NAME: COMMONWEALTH SCIENTIFIC AND INDUSTRIAL
RESEARCH ORGANISATION
(B) STREET: LIMESTONE AVENUE
(C) CITY: CAMPBELL
10 (D) STATE: ACT
(E) COUNTRY: AUSTRALIA
(F) POSTAL CODE (ZIP): 2612
- 15 (ii) TITLE OF INVENTION: CONTROL OF FLOWERING
- (iii) NUMBER OF SEQUENCES: 3
- (iv) COMPUTER READABLE FORM:
(A) MEDIUM TYPE: Floppy disk
20 (B) COMPUTER: IBM PC compatible
(C) OPERATING SYSTEM: PC-DOS/MS-DOS
(D) SOFTWARE: PatentIn Release #1.0, Version #1.30 (EPO)

25 (2) INFORMATION FOR SEQ ID NO: 1:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 7968 base pairs
(B) TYPE: nucleic acid
30 (C) STRANDEDNESS: single
(D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: DNA (genomic)
- 35 (iii) HYPOTHETICAL: NO
- (iv) ANTI-SENSE: NO
- (vi) ORIGINAL SOURCE:
40 (A) ORGANISM: Arabidopsis thaliana

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:

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(2) INFORMATION FOR SEQ ID NO: 2:

- 45 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 943 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear
- 50 (ii) MOLECULE TYPE: cDNA
- (iii) HYPOTHETICAL: NO
- 55 (iv) ANTI-SENSE: NO
- (vi) ORIGINAL SOURCE:
(A) ORGANISM: *Arabidopsis thaliana*

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(2) INFORMATION FOR SEQ ID NO: 3:

- 55 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 196 amino acids
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5 (iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(vi) ORIGINAL SOURCE:

10 (A) ORGANISM: *Arabidopsis thaliana*

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3:

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<212> DNA

<213> Brassica napus

<400> 4

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aagtagccga caagttacct tctctaaacg acgcaacggt ctcacgaga aagctcgtca 180

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gctttccgtt ctctgtgacg catccgtcgc tcttcttgte gtctccgcct ccgggaaact 240
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tgatgatgat cttaaagcct tggatcgta gtcaaaagct ttggactgtg gttcacacca 360
tgagctactg gaacttgtgg aaagcaagct tgaggaatca aatgtcgata atgtaagtgt 420
gggttccctg gttcagctgg aggaacacct tgagaacgcc ctctccgtaa caagagctag 480
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tgataatatg gatgtctcac caggacaaat ctccgacatc aatcttccgg taacgctccc 660
actgcttaat tagtcacctt taatcggcga ataaataaaa tccaaaacat ataactaaaa 720
caacaagat gtgtaattat ccccttgtaa aggggtgtacg ttgtataatc tatactctct 780
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atgcaagaca ctttcaaact taaaaaaa 868

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<210> 5

<211> 792

<212> DNA

<213> Brassica napus

<400> 5

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tcgtcagctt tcagttctct gcgatgcac cgctcgtctt ctggttgtct cagcctccgg 180
caagctttac aacttctccg ccggcgataa cctgggtcaag atccttgatc gatatggaaa 240
acaacatgct gatgatctta aagctctgga tcttcagtca aaagctccga agtatgggtc 300
acaccatgag ctactagagc ttgtcgaaag taagcttgtg gaatcaaatt ctgatgtaag 360
cgtcgactcc ctcgttcagc tggaggacca ccttgagact gccctctccg taactagagc 420
taggaagaca gaactaatgt tgaagcttgt tgatagcctc aaagaaaagg agaaattgct 480
gaaagaagag aaccaggggt tggctagcca gatggagaag aataatcttg cgggagccga 540
agctgataaa atggagatgt cacctggaca aatctctgac atcaatcgtc cggtaaactc 600
ccgactgctt tattagccnc cttaagtcca aaacttgtga ctaaaaacaa aaataagtta 660
tcgaactatt cccctataag ggtgaacgtt gtatatcttc attctctctg gctgagagac 720
cccggtgtgta aaactatggt tagatttaag taaaaatata tatttaagac atactaaaaa 780
aaaaaaaaaa aa 792

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<210> 6

<211> 990

<212> DNA

<213> Brassica napus

<400> 6

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aaagctcgtc agctttctgt tctctgcgat gcatccgtcg cgcttctcgt tgtctcctcc 180
tccggcaagc tctacagctt ctccgccggt gataacctgg tcaggatcct tgatcgatat 240
ggaaaacagc atgctgatga tcttaaagcc ctgaatcttc agtcaaaagc tctgagctat 300
ggttcacaca atgagttact tgaacttgtg gatagcaagc ttgtggaatc aatgtcgggt 360

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ggtgtaagcg tggacaccct cggtcagctg gaggggtgtcc ttgaaaatgc cctctctcta 420
actagagcta ggaagacaga actaatgttg aagcttggtg atagcctcaa agaaaaggag 480
aagctgctga aagaagagaa tcagggtttg gctggccaga aggagaagaa gaatcttgcg 540
ggagccgaag ctgataatat ggagatgtca cctggacaaa tctccgacat caatcttccg 600
gtaactctcc cactgcttaa ttagccaccg ttagacgggg ctgatcaaat taaaaaatcc 660
aaaacataca actaaataaa taagctttgt tgtttttcac cttgaaggg tgcacgttgt 720
atatctcaat actcccttgg ctgagagatt gtgtgtttac tcctatgtta gatataatga 780
gtaaaataaa aataaaaaga tctttgtacc ttcgtcgaga gagaattgta gtgagtgtgc 840
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catagagggt gtcattggtt aaaaaaaaaa 990

<210> 7

<211> 780

<212> DNA

<213> Brassica napus

<400> 7

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gagaaagctc gtcagctttc agttctctgc gatgcacccg tcgctcttct cgttgctctca 180
gcctccggca agcttttaca cttctccgcc ggcgataacc tggtaagat ccttgatcga 240
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tatggttcac accatgagct actagagctt gtcgaaagta agcttggtga atcaaattct 360
gatgtaagcg tcgactccct cggtcagctg gaggaccacc ttgagactgc cctctccgta 420
actagagcta ggaagacaga actaatgttg aagcttggtg atagcctcaa agaaaaggag 480
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ggagccgaag ctgataaaaat ggagatgtca cctggacaaa tctctgacat caatcgctccg 600
gtaactctcc gactgcttta ttagccacct taagtccaaa acttggtgact aaaaacaaaa 660
ataagttatc gaactattcc cctataaggg tgaacgttgt atatcttcat tctctctggc 720
tgagagaccc ccgtgtgtaa actatggnta gatttaagta aaatatatnt ttaagacana 780

<210> 8

<211> 845

<212> DNA

<213> Brassica napus

<400> 8

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taaagccttg gatcgctcagt caaaagcttt ggactgtggt tcacaccatg agctactgga 360
acttggtgga agcaagcttg aggaatcaaa tgtcgataat gtaagtgtgg gttccctggt 420
tcagctggag gaacaccttg agaacgcct ctccgtaaca agagctagga agacagaact 480

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aatgttgaag cttgtcgaga accttaaaga aaaggagaag ttgctggaag aggagaacca 540
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tgtctcacca ggacaaatct ccgacatcaa tcttccggta acgctcccac tgcttaatta 660
gtcaccttta atcggcgaat aaataaaatc caaaacatat aactaaaaca aacaagatgt 720
gtaattatcc ccttgtaaag ggtgtacgtt gtataatcta tactctctct ccggctcgag 780
aggcttcggg tgtaaaacta tttcagattt atgtaagata gaaaatctat gcaagacact 840
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845

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<210> 9

<211> 825

<212> DNA

<213> Brassica napus

<400> 9

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gtcaccttct ccaaacgacg caatggtctc atcgagaaag ctgctcagct ttcagttctc 180
tgcatgcat ccgtcgctct tctcgttgct tcagcctccg gcaagcttta caacttctcc 240
gccggcgata acctggtcaa gatccttgat cgatatggaa aacaacatgc tgatgatctt 300
aaagctctgg atcttcagtc aaaagctccg aagtatgggt cacaccatga gctactagag 360
cttgtcgaaa gtaagcttgt ggaatcaaat tctgatgtaa gcgtcgactc cctcgttcag 420
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ttgaagcttg ttgatagcct caaagaaaag gagaaattgc tgaaagaaga gaaccagggg 540
ttggctagcc agatggagaa gaataatctt gcgggagccg aagctgataa aatggagatg 600
tcacctggac aaatctctga catcaatcgt ccggttaact tccgactgct ttattagcca 660
ccttaagtcc aaaacttggt actaaaaaca aaaataagtt atcgaaactat tcccctataa 720
gggtgaacgt tgtatatctt cattctctct ggctgagaga ccccggtgtgt aaaactatgg 780
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825

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<210> 10

<211> 891

<212> DNA

<213> Brassica napus

<400> 10

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gttaccttct ctaaacgacg caacggtctc atcgagaaag ctgctcagct ttccgttctc 180
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tccggtgata acctggtcaa gatccttgat cgatatggaa agcaacatga tgatgatctt 300
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cttgtggaaa gcaagcttga ggaatcaaat gtcgataatg taagtgtggg ttccctgggt 420
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atgttgaagc ttgtcgagaa ccttaaagaa aaggagaagt tgctggaaga ggagaacat 540
gttttggcta gccagatgga gaagagtaat cttgtgcgag ccgaagctga taatatggat 600
gtctcaccag gacaaatctc cgacatcaat cttccggtaa cgctcccact gcttaattag 660

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tcaccttttaa tcggcgaata aataaaatcc aaaacatata actaaaacaa acaagatgtg 720
taattatccc cttgtaaagg gtgtacgttg tataatctat actctctctc cggctcgaga 780
ggcttcgggt gtaaaactat ttcagattta tgtaagatag aaaatctatg caagacactt 840
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<210> 11

<211> 196

<212> PRT

<213> Brassica napus

<400> 11

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Arg Gln Val Thr Phe Ser Lys Arg Arg Asn Gly Leu Ile Glu Lys Ala
20 25 30

Arg Gln Leu Ser Val Leu Cys Asp Ala Ser Val Ala Leu Leu Val Val
35 40 45

Ser Ala Ser Gly Lys Leu Tyr Asn Phe Ser Ala Gly Asp Asp Leu Val
50 55 60

Lys Ile Val Asp Arg Tyr Gly Lys Gln His Ala Asp Asp Arg Lys Ala
65 70 75 80

Leu Asp Leu Gln Ser Glu Ala Pro Lys Tyr Gly Ser His His Glu Leu
85 90 95

Leu Glu Leu Val Glu Ser Lys Leu Val Glu Ser Asn Ser Asp Val Ser
100 105 110

Val Asp Ser Leu Val Gln Leu Glu Asn His Leu Glu Thr Ala Leu Ser
115 120 125

Val Thr Arg Ala Arg Lys Thr Glu Leu Leu Leu Lys Leu Val Asp Ser
130 135 140

Leu Lys Glu Lys Glu Lys Leu Leu Lys Glu Glu Asn Gln Gly Leu Ala
145 150 155 160

Ser Gln Met Glu Lys Asn Asn Leu Ala Gly Ala Glu Ala Asp Lys Met
165 170 175

Glu Val Ser Pro Gly Gln Ile Ser Asp Ile Asn Cys Pro Val Thr Leu
180 185 190

Pro Leu Leu Tyr
195

<210> 12
<211> 196
<212> PRT
<213> Brassica napus

<400> 12

Met Gly Arg Lys Lys Leu Glu Ile Lys Arg Ile Glu Lys Asn Ser Ser
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Arg Gln Val Thr Phe Cys Lys Arg Arg Asn Gly Leu Ile Glu Lys Ala
20 25 30

Arg Gln Leu Ser Val Leu Cys Glu Ala Ser Val Gly Leu Leu Val Val
35 40 45

Ser Ala Ser Asp Lys Leu Tyr Ser Phe Ser Ser Gly Asp Arg Leu Glu
50 55 60

Lys Ile Leu Asp Arg Tyr Gly Lys Lys His Ala Asp Asp Leu Asn Ala
65 70 75 80

Leu Asp Leu Gln Ser Lys Ser Leu Asn Tyr Ser Ser His His Glu Leu
85 90 95

Leu Glu Leu Val Glu Ser Lys Leu Val Glu Ser Ile Asp Asp Val Ser
100 105 110

Val Asp Ser Leu Val Glu Leu Glu Asp His Leu Glu Thr Ala Leu Ser
115 120 125

Val Thr Arg Ala Arg Lys Ala Glu Leu Met Leu Lys Leu Val Glu Ser
130 135 140

Leu Lys Glu Lys Glu Asn Leu Leu Lys Glu Glu Asn Gln Val Leu Ala
145 150 155 160

Ser Gln Ile Glu Lys Lys Asn Leu Glu Gly Ala Glu Ala Asp Asn Ile
165 170 175

Glu Met Ser Ser Gly Gln Ile Ser Asp Ile Asn Leu Pro Val Thr Leu
180 185 190

Pro Leu Leu Asn
195

<210> 13
<211> 197
<212> PRT
<213> Brassica napus

<400> 13

Met Gly Arg Lys Lys Leu Glu Ile Lys Arg Ile Glu Asn Lys Ser Ser
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Arg Gln Val Thr Phe Ser Lys Arg Arg Ser Gly Leu Ile Glu Lys Ala
20 25 30

Arg Gln Leu Ser Val Leu Cys Asp Ala Ser Val Ala Leu Leu Val Val
35 40 45

Ser Ser Ser Gly Lys Leu Tyr Ser Phe Ser Ala Gly Asp Asn Leu Val
50 55 60

Arg Ile Leu Asp Arg Tyr Gly Lys Gln His Ala Asp Asp Leu Lys Ala
65 70 75 80

Leu Asn Leu Gln Ser Lys Ala Leu Ser Tyr Gly Ser His Asn Glu Leu
85 90 95

Leu Glu Leu Val Asp Ser Lys Leu Val Glu Ser Asn Val Gly Gly Val
100 105 110

Ser Val Asp Thr Leu Val Gln Leu Glu Gly Val Leu Glu Asn Ala Leu
115 120 125

Ser Leu Thr Arg Ala Arg Lys Thr Glu Leu Met Leu Lys Leu Val Asp
130 135 140

Ser Leu Lys Glu Lys Glu Lys Leu Leu Lys Glu Glu Asn Gln Ala Leu
145 150 155 160

Ala Gly Gln Lys Glu Lys Lys Asn Leu Ala Gly Ala Glu Ala Asp Asn
165 170 175

Met Glu Met Ser Pro Gly Gln Ile Ser Asp Ile Asn Leu Pro Val Thr
180 185 190

Leu Pro Leu Leu Asn
195

<210> 14

<211> 197

<212> PRT

<213> Brassica napus

<400> 14

Met Gly Arg Lys Lys Leu Glu Ile Lys Arg Ile Glu Asn Lys Ser Ser
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Arg Gln Val Thr Phe Ser Lys Arg Arg Asn Gly Leu Ile Glu Lys Ala
 20 25 30

Arg Gln Leu Ser Val Leu Cys Asp Ala Ser Val Ala Leu Leu Val Val
 35 40 45

Ser Ala Ser Gly Lys Leu Tyr Ser Phe Ser Ser Gly Asp Asn Leu Val
 50 55 60

Lys Ile Leu Asp Arg Tyr Gly Lys Gln His Asp Asp Asp Leu Lys Ala
 65 70 75 80

Leu Asp Arg Gln Ser Lys Ala Leu Asp Cys Gly Ser His His Glu Leu
 85 90 95

Leu Glu Leu Val Glu Ser Lys Leu Glu Glu Ser Asn Val Asp Asn Val
 100 105 110

Ser Val Gly Ser Leu Val Gln Leu Glu Glu His Leu Glu Asn Ala Leu
 115 120 125

Ser Val Thr Arg Ala Arg Lys Thr Glu Leu Met Leu Lys Leu Val Glu
 130 135 140

Asn Leu Lys Glu Lys Glu Lys Leu Leu Glu Glu Glu Asn His Val Leu
 145 150 155 160

Ala Ser Gln Met Glu Lys Ser Asn Leu Val Arg Ala Glu Ala Asp Asn
 165 170 175

Met Asp Val Ser Pro Gly Gln Ile Ser Asp Ile Asn Leu Pro Val Thr
 180 185 190

Leu Pro Leu Leu Asn
 195

<210> 15

<211> 196

<212> PRT

<213> Brassica napus

<400> 15

Met Gly Arg Lys Lys Leu Glu Ile Lys Arg Ile Glu Asn Lys Ser Ser
1 5 10 15

Arg Gln Val Thr Phe Ser Lys Arg Arg Asn Gly Leu Ile Glu Lys Ala
20 25 30

Arg Gln Leu Ser Val Leu Cys Asp Ala Ser Val Ala Leu Leu Val Val
35 40 45

Ser Ala Ser Gly Lys Leu Tyr Asn Phe Ser Ala Gly Asp Asn Leu Val
50 55 60

Lys Ile Leu Asp Arg Tyr Gly Lys Gln His Ala Asp Asp Leu Lys Ala
65 70 75 80

Leu Asp Leu Gln Ser Lys Ala Pro Lys Tyr Gly Ser His His Glu Leu
85 90 95

Leu Glu Leu Val Glu Ser Lys Leu Val Glu Ser Asn Ser Asp Val Ser
100 105 110

Val Asp Ser Leu Val Gln Leu Glu Asp His Leu Glu Thr Ala Leu Ser
115 120 125

Val Thr Arg Ala Arg Lys Thr Glu Leu Met Leu Lys Leu Val Asp Ser
130 135 140

Leu Lys Glu Lys Glu Lys Leu Leu Lys Glu Glu Asn Gln Gly Leu Ala
145 150 155 160

Ser Gln Met Glu Lys Asn Asn Leu Ala Gly Ala Glu Ala Asp Lys Met
165 170 175

Glu Met Ser Pro Gly Gln Ile Ser Asp Ile Asn Arg Pro Val Thr Leu
180 185 190

Arg Leu Leu Tyr
195

<210> 16

<211> 197

<212> PRT

<213> Brassica napus

<400> 16

Met Gly Arg Lys Lys Leu Glu Ile Lys Arg Ile Glu Asn Lys Ser Ser
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Arg Gln Val Thr Phe Ser Lys Arg Arg Ser Gly Leu Ile Glu Lys Ala
20 25 30

Arg Gln Leu Ser Val Leu Cys Asp Ala Ser Val Ala Leu Leu Val Val
35 40 45

Ser Ser Ser Gly Lys Leu Tyr Ser Phe Ser Ala Gly Asp Asn Leu Val
50 55 60

Arg Ile Leu Asp Arg Tyr Gly Lys Gln His Ala Asp Asp Leu Lys Ala
65 70 75 80

Leu Asn Leu Gln Ser Lys Ala Leu Ser Tyr Gly Ser His Asn Glu Leu
85 90 95

Leu Glu Leu Val Asp Ser Lys Leu Val Glu Ser Asn Val Gly Gly Val
100 105 110

Ser Val Asp Thr Leu Val Gln Leu Glu Gly Val Leu Glu Asn Ala Leu
115 120 125

Ser Leu Thr Arg Ala Arg Lys Thr Glu Leu Met Leu Lys Leu Val Asp
130 135 140

Ser Leu Lys Glu Lys Glu Lys Leu Leu Lys Glu Glu Asn Gln Ala Leu
145 150 155 160

Ala Gly Gln Lys Glu Lys Lys Asn Leu Ala Gly Ala Glu Ala Asp Asn
165 170 175

Met Glu Met Ser Pro Gly Gln Ile Ser Asp Ile Asn Leu Pro Val Thr
180 185 190

Leu Pro Leu Leu Asn
195

<210> 17

<211> 196

<212> PRT

<213> Brassica napus

<400> 17

Met Gly Arg Lys Lys Leu Glu Ile Lys Arg Ile Glu Asn Lys Ser Ser
 1 5 10 15
 Arg Gln Val Thr Phe Ser Lys Arg Arg Asn Gly Leu Ile Glu Lys Ala
 20 25 30
 Arg Gln Leu Ser Val Leu Cys Asp Ala Ser Val Ala Leu Leu Val Val
 35 40 45
 Ser Ala Ser Gly Lys Leu Tyr Asn Phe Ser Ala Gly Asp Asn Leu Val
 50 55 60
 Lys Ile Leu Asp Arg Tyr Gly Lys Gln His Ala Asp Asp Leu Lys Ala
 65 70 75 80
 Leu Asp Leu Gln Ser Lys Ala Pro Lys Tyr Gly Ser His His Glu Leu
 85 90 95
 Leu Glu Leu Val Glu Ser Lys Leu Val Glu Ser Asn Ser Asp Val Ser
 100 105 110
 Val Asp Ser Leu Val Gln Leu Glu Asp His Leu Glu Thr Ala Leu Ser
 115 120 125
 Val Thr Arg Ala Arg Lys Thr Glu Leu Met Leu Lys Leu Val Asp Ser
 130 135 140
 Leu Lys Glu Lys Glu Lys Leu Leu Lys Glu Glu Asn Gln Gly Leu Ala
 145 150 155 160
 Ser Gln Met Glu Lys Asn Asn Leu Ala Gly Ala Glu Ala Asp Lys Met
 165 170 175
 Glu Met Ser Pro Gly Gln Ile Ser Asp Ile Asn Arg Pro Val Thr Leu
 180 185 190
 Arg Leu Leu Tyr
 195

<210> 18

<211> 197

<212> PRT

<213> Brassica napus

<400> 18

Met Gly Arg Lys Lys Leu Glu Ile Lys Arg Ile Glu Asn Lys Ser Ser
 1 5 10 15

Arg Gln Val Thr Phe Ser Lys Arg Arg Asn Gly Leu Ile Glu Lys Ala
 20 25 30

Arg Gln Leu Ser Val Leu Cys Asp Ala Ser Val Ala Leu Val Val
 35 40 45

Ser Ala Ser Gly Lys Leu Tyr Ser Phe Ser Ser Gly Asp Asn Leu Val
 50 55 60

Lys Ile Leu Asp Arg Tyr Gly Lys Gln His Asp Asp Asp Leu Lys Ala
 65 70 75 80

Leu Asp Arg Gln Ser Lys Ala Leu Asp Cys Gly Ser His His Glu Leu
 85 90 95

Leu Glu Leu Val Glu Ser Lys Leu Glu Glu Ser Asn Val Asp Asn Val
 100 105 110

Ser Val Gly Ser Leu Val Gln Leu Glu Glu His Leu Glu Asn Ala Leu
 115 120 125

Ser Val Thr Arg Ala Arg Lys Thr Glu Leu Met Leu Lys Leu Val Glu
 130 135 140

Asn Leu Lys Glu Lys Glu Lys Leu Leu Glu Glu Glu Asn His Val Leu
 145 150 155 160

Ala Ser Gln Met Glu Lys Ser Asn Leu Val Arg Ala Glu Ala Asp Asn
 165 170 175

Met Asp Val Ser Pro Gly Gln Ile Ser Asp Ile Asn Leu Pro Val Thr
 180 185 190

Leu Pro Leu Leu Asn
 195

<210> 19

<211> 196

<212> PRT

<213> Brassica napus

<400> 19

Met Gly Arg Lys Lys Leu Glu Ile Lys Arg Ile Glu Asn Lys Ser Ser
 1 5 10 15

Arg Gln Val Thr Phe Ser Lys Arg Arg Asn Gly Leu Ile Glu Lys Ala

20

25

30

Arg Gln Leu Ser Val Leu Cys Asp Ala Ser Val Ala Leu Leu Val Val
 35 40 45

Ser Ala Ser Gly Lys Leu Tyr Asn Phe Ser Ala Gly Asp Asn Leu Val
 50 55 60

Lys Ile Leu Asp Arg Tyr Gly Lys Gln His Ala Asp Asp Leu Lys Ala
 65 70 75 80

Leu Asp Leu Gln Ser Lys Ala Pro Lys Tyr Gly Ser His His Glu Leu
 85 90 95

Leu Glu Leu Val Glu Ser Lys Leu Val Glu Ser Asn Ser Asp Val Ser
 100 105 110

Val Asp Ser Leu Val Gln Leu Glu Asp His Leu Glu Thr Ala Leu Ser
 115 120 125

Val Thr Arg Ala Arg Lys Thr Glu Leu Met Leu Lys Leu Val Asp Ser
 130 135 140

Leu Lys Glu Lys Glu Lys Leu Leu Lys Glu Glu Asn Gln Gly Leu Ala
 145 150 155 160

Ser Gln Met Glu Lys Asn Asn Leu Ala Gly Ala Glu Ala Asp Lys Met
 165 170 175

Glu Met Ser Pro Gly Gln Ile Ser Asp Ile Asn Arg Pro Val Thr Leu
 180 185 190

Arg Leu Leu Tyr
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<210> 20

<211> 197

<212> PRT

<213> Brassica napus

<400> 20

Met Gly Arg Lys Lys Leu Glu Ile Lys Arg Ile Glu Asn Lys Ser Ser
 1 5 10 15

Arg Gln Val Thr Phe Ser Lys Arg Arg Asn Gly Leu Ile Glu Lys Ala
 20 25 30

Arg Gln Leu Ser Val Leu Cys Asp Ala Ser Val Ala Leu Leu Val Val
 35 40 45

Ser Ala Ser Gly Lys Leu Tyr Ser Phe Ser Ser Gly Asp Asn Leu Val
 50 55 60

Lys Ile Leu Asp Arg Tyr Gly Lys Gln His Asp Asp Asp Leu Lys Ala
 65 70 75 80

Leu Asp Arg Gln Ser Lys Ala Leu Asp Cys Gly Ser His His Glu Leu
 85 90 95

Leu Glu Leu Val Glu Ser Lys Leu Glu Glu Ser Asn Val Asp Asn Val
 100 105 110

Ser Val Gly Ser Leu Val Gln Leu Glu Glu His Leu Glu Asn Ala Leu
 115 120 125

Ser Val Thr Arg Ala Arg Lys Thr Glu Leu Met Leu Lys Leu Val Glu
 130 135 140

Asn Leu Lys Glu Lys Glu Lys Leu Leu Glu Glu Glu Asn His Val Leu
 145 150 155 160

Ala Ser Gln Met Glu Lys Ser Asn Leu Val Arg Ala Glu Ala Asp Asn
 165 170 175

Met Asp Val Ser Pro Gly Gln Ile Ser Asp Ile Asn Leu Pro Val Thr
 180 185 190

Leu Pro Leu Leu Asn
 195

<210> 21

<211> 196

<212> PRT

<213> Brassica napus

<400> 21

Met Gly Arg Arg Lys Ile Glu Ile Lys Arg Ile Glu Asn Lys Ser Ser
 1 5 10 15

Arg Gln Val Thr Phe Ser Lys Arg Arg Asn Gly Leu Ile Asp Lys Ala
 20 25 30

Arg Gln Leu Ser Ile Leu Cys Glu Ser Ser Val Ala Val Val Val Val
 35 40 45

Ser Ala Ser Gly Lys Leu Tyr Asp Ser Ser Ser Gly Asp Asp Ile Ser
 50 55 60

Lys Ile Ile Asp Arg Tyr Glu Ile Gln His Ala Asp Glu Leu Arg Ala
 65 70 75 80

Leu Asp Leu Glu Glu Lys Ile Gln Asn Tyr Leu Pro His Lys Glu Leu
 85 90 95

Leu Glu Thr Val Gln Ser Lys Leu Glu Glu Pro Asn Val Asp Asn Val
 100 105 110

Ser Val Asp Ser Leu Ile Ser Leu Glu Glu Gln Leu Glu Thr Ala Leu
 115 120 125

Ser Val Ser Arg Ala Arg Lys Ala Glu Leu Met Met Glu Tyr Ile Glu
 130 135 140

Ser Leu Lys Glu Lys Glu Lys Leu Leu Arg Glu Glu Asn Gln Val Leu
 145 150 155 160

Ala Ser Gln Met Gly Lys Asn Thr Leu Leu Ala Thr Asp Asp Glu Arg
 165 170 175

Gly Met Phe Pro Gly Ser Ser Ser Gly Asn Lys Ile Pro Glu Thr Leu
 180 185 190

Pro Leu Leu Asn
 195

<210> 22

<211> 196

<212> PRT

<213> Brassica napus

<400> 22

Met Gly Arg Arg Lys Val Glu Ile Lys Arg Ile Glu Asn Lys Ser Ser
 1 5 10 15

Arg Gln Val Thr Phe Ser Lys Arg Arg Lys Gly Leu Ile Glu Lys Ala
 20 25 30

Arg Gln Leu Ser Ile Leu Cys Glu Ser Ser Ile Ala Val Val Ala Val
 35 40 45

Ser Gly Ser Gly Lys Leu Tyr Asp Ser Ala Ser Gly Asp Asn Met Ser

50 55 60
 Lys Ile Ile Asp Arg Tyr Glu Ile His His Ala Asp Glu Leu Lys Ala
 65 70 75 80
 Leu Asp Leu Ala Glu Lys Ile Arg Asn Tyr Leu Pro His Lys Glu Leu
 85 90 95
 Leu Glu Ile Val Gln Ser Lys Leu Glu Glu Ser Asn Val Asp Asn Val
 100 105 110
 Ser Val Asp Ser Leu Ile Ser Met Glu Glu Gln Leu Glu Thr Ala Leu
 115 120 125
 Ser Val Ile Arg Ala Lys Lys Thr Glu Leu Met Met Glu Asp Met Lys
 130 135 140
 Ser Leu Gln Glu Arg Glu Lys Leu Leu Ile Glu Glu Asn Gln Ile Leu
 145 150 155 160
 Ala Ser Gln Val Gly Lys Lys Thr Phe Leu Val Ile Glu Gly Asp Arg
 165 170 175
 Gly Met Ser Arg Glu Asn Gly Ser Gly Asn Lys Val Pro Glu Thr Leu
 180 185 190
 Ser Leu Leu Lys
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<210> 23

<211> 200

<212> PRT

<213> Brassica napus

<400> 23

Met Gly Arg Arg Lys Val Glu Ile Lys Arg Ile Glu Asn Lys Ser Ser
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Arg Gln Val Thr Phe Cys Lys Arg Arg Asn Gly Leu Met Glu Lys Ala
 20 25 30

Arg Gln Leu Ser Ile Leu Cys Glu Ser Ser Val Ala Leu Ile Ile
 35 40 45

Ser Ala Thr Gly Arg Leu Tyr Ser Phe Ser Ser Gly Asp Ser Met Ala
 50 55 60

Lys Ile Leu Ser Arg Tyr Glu Leu Glu Gln Ala Asp Asp Leu Lys Thr
65 70 75 80

Leu Asp Leu Glu Glu Lys Thr Leu Asn Tyr Leu Ser His Lys Glu Leu
85 90 95

Leu Glu Thr Ile Gln Cys Lys Ile Glu Glu Ala Lys Ser Asp Asn Val
100 105 110

Ser Ile Asp Cys Leu Lys Ser Leu Glu Glu Gln Leu Lys Thr Ala Leu
115 120 125

Ser Val Thr Arg Ala Arg Lys Thr Glu Leu Met Met Glu Leu Val Lys
130 135 140

Thr His Gln Glu Lys Glu Lys Leu Leu Arg Glu Glu Asn Gln Ser Leu
145 150 155 160

Thr Asn Gln Leu Ile Lys Met Gly Lys Met Lys Lys Ser Val Glu Ala
165 170 175

Glu Asp Ala Arg Ala Met Ser Pro Glu Ser Ser Ser Asp Asn Lys Pro
180 185 190

Pro Glu Thr Leu Leu Leu Lys
195 200

<210> 24

<211> 198

<212> PRT

<213> Brassica napus

<400> 24

Met Gly Arg Arg Arg Val Glu Ile Lys Arg Ile Glu Asn Lys Ser Ser
1 5 10 15

Arg Gln Val Thr Phe Cys Lys Arg Arg Asn Gly Leu Met Glu Lys Ala
20 25 30

Arg Gln Leu Ser Ile Leu Cys Gly Ser Ser Val Ala Leu Phe Ile Val
35 40 45

Ser Ser Thr Gly Lys Leu Tyr Asn Ser Ser Ser Gly Asp Ser Met Ala
50 55 60

Lys Ile Ile Ser Arg Phe Lys Ile Gln Gln Ala Asp Asp Pro Glu Thr
65 70 75 80

Leu Asp Leu Glu Asp Lys Thr Gln Asp Tyr Leu Ser His Lys Glu Leu
 85 90 95

Leu Glu Ile Val Gln Arg Lys Ile Glu Glu Ala Lys Gly Asp Asn Val
 100 105 110

Ser Ile Glu Ser Leu Ile Ser Met Glu Glu Gln Leu Lys Ser Ala Leu
 115 120 125

Ser Val Ile Arg Ala Arg Lys Thr Glu Leu Leu Met Glu Leu Val Lys
 130 135 140

Asn Leu Gln Asp Lys Glu Lys Leu Leu Lys Glu Lys Asn Lys Val Leu
 145 150 155 160

Ala Ser Glu Val Gly Lys Leu Lys Lys Ile Leu Glu Thr Gly Asp Glu
 165 170 175

Arg Ala Val Met Ser Pro Glu Asn Ser Ser Gly His Ser Pro Pro Glu
 180 185 190

Thr Leu Pro Leu Leu Lys
 195

<210> 25

<211> 196

<212> PRT

<213> Brassica napus

<400> 25

Met Gly Arg Lys Lys Val Glu Ile Lys Arg Ile Glu Asn Lys Ser Ser
 1 5 10 15

Arg Gln Val Thr Phe Ser Lys Arg Arg Asn Gly Leu Ile Glu Lys Ala
 20 25 30

Arg Gln Leu Ser Ile Leu Cys Glu Ser Ser Ile Ala Val Leu Val Val
 35 40 45

Ser Gly Ser Gly Lys Leu Tyr Lys Ser Ala Ser Gly Asp Asn Met Ser
 50 55 60

Lys Ile Ile Asp Arg Tyr Glu Ile His His Ala Asp Glu Leu Glu Ala
 65 70 75 80

Leu Asp Leu Ala Glu Lys Thr Arg Asn Tyr Leu Pro Leu Lys Glu Leu

85

90

95

Leu Glu Ile Val Gln Ser Lys Leu Glu Glu Ser Asn Val Asp Asn Ala
100 105 110

Ser Val Asp Thr Leu Ile Ser Leu Glu Glu Gln Leu Glu Thr Ala Leu
115 120 125

Ser Val Thr Arg Ala Arg Lys Thr Glu Leu Met Met Gly Glu Val Lys
130 135 140

Ser Leu Gln Lys Thr Glu Asn Leu Leu Arg Glu Glu Asn Gln Thr Leu
145 150 155 160

Ala Ser Gln Val Gly Lys Lys Thr Phe Leu Val Ile Glu Gly Asp Arg
165 170 175

Gly Met Ser Trp Glu Asn Gly Ser Gly Asn Lys Val Arg Glu Thr Leu
180 185 190

Pro Leu Leu Lys
195

<210> 26

<211> 691

<212> DNA

<213> Brassica napus

<400> 26

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tcttctcatt tcttactttg tttgttgaaa cgattgttca cttatattta atttgttgca 420
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<210> 27

<211> 68

<212> PRT

<213> Brassica napus

<400> 27

Asn Leu Gln Ser Lys Ala Leu Ser Tyr Gly Ser His Asn Glu Leu Leu
1 5 10 15

Glu Leu Val Asp Ser Lys Leu Val Glu Ser Asn Val Gly Gly Val Ser
20 25 30

Val Asp Thr Leu Val Gln Leu Glu Gly Val Leu Glu Asn Ala Leu Ser
35 40 45

Leu Thr Arg Ala Arg Lys Thr Glu Leu Met Leu Lys Leu Val Asp Ser
50 55 60

Leu Lys Glu Lys
65